

**Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In The Matter of)	
)	
Promoting Interoperability in the 700 MHz)	WT Docket No. 12-69
Commercial Spectrum)	
)	

To: The Commission

REPLY COMMENTS OF VERIZON WIRELESS

The record in this proceeding¹ shows that interoperability in the Lower 700 MHz band can best be promoted through voluntary industry efforts, rather than prescriptive regulatory solutions. Multiple commenters identify a number of proposals that will resolve the interference issues that have impeded the development of interoperable Lower 700 MHz devices. If adopted, these proposals will not only encourage the development of interoperable Lower 700 MHz devices but will also promote deployment of the Lower 700 MHz A Block. Accordingly, the Commission should adopt multiple commenters' proposals to provide incentives for Channel 51 licensees to relocate to other channels and/or cease operations as soon as possible. In addition, the Commission should reject commenters' calls to expand the scope of this proceeding beyond the Lower 700 MHz band. These commenters ignore the limitations on including multiple bands in a single device and fail to present any reason why the Commission should expand the scope of this proceeding.

¹ See *Promoting Interoperability in the 700 MHz Commercial Spectrum; Interoperability of Mobile User Equipment Across Paired Commercial Spectrum Blocks in the 700 MHz Band*, Notice of Proposed Rulemaking, 27 FCC Rcd 3521 (2012) ("NPRM").

I. THE COMMISSION SHOULD TAKE ACTIONS THAT WILL RESOLVE CHANNEL 51 INTERFERENCE ISSUES.

Multiple commenters noted the impact of interference issues related to Channel 51 broadcast operations on the technical feasibility of mobile devices that operate on the adjacent Lower 700 MHz A Block.² As Verizon Wireless stated in its initial comments, “[o]nce the issues arising from Channel 51 operations are eliminated, an industry solution is likely to emerge for interoperable equipment in the Lower 700 MHz band without the need for equipment mandates.”³ The Commission therefore should focus its efforts on resolving the interference issues related to Channel 51 broadcast operations.

First, as several commenters proposed, the Commission should take steps immediately to encourage Channel 51 licensees to cease or relocate their operations in the near term.⁴ For example, the Commission can allow Channel 51 broadcasters to channel share with other broadcasters, without losing either their ability to participate independently in a future incentive auction or their must-carry rights. Further, the Commission can adopt expedited procedures under which Channel 51 broadcasters may relocate to other available channels.⁵ The Commission also can permit the sale of Channel 51 licenses to entities that will not operate on the spectrum pending the upcoming incentive auctions, including wireless providers, essentially allowing the broadcaster to “auction” its license now and the purchaser of that license to

² Blooston Rural Carriers Comments at 4-5; CTIA Comments at 3-6; AT&T Comments at 44-48; MetroPCS Comments at 12; Telecommunications Industry Association Comments at 5; Motorola Mobility Comments at 2-3; Qualcomm Comments at 34-58.

³ Verizon Wireless Comments at 3.

⁴ See, e.g., AT&T Comments at 45-46; CTIA Comments at 3-6; Blooston Rural Carriers Comments at 5; Rural Telecommunications Group Comments at 13-14, National Telecommunications Cooperative Association (NTCA) Comments at 8-9; MetroPCS Comments at 12.

⁵ See CTIA Comments at 6.

participate in a future incentive auction. Finally, the Commission can allow Channel 51 broadcasters to maintain non-operational licenses beyond one year if necessary.⁶ Similarly, the FCC can waive its minimum operating requirements for Channel 51 broadcasters and any other rules that may prohibit a licensee from ceasing operations.⁷ Such waivers would allow Channel 51 broadcasters to cease operations without losing their licenses and thus their ability to participate in a future incentive auction. These waivers could be based on promoting the public interest by resolving the special circumstances surrounding Channel 51 and the Lower 700 MHz A Block.⁸ The Commission can also take actions to ensure current Channel 51 broadcasters retain their ability to access viewers through multichannel video providers. Of course, there also may be other steps the Commission could take to address the Channel 51 issues, but those listed above are all steps identified in the record by various parties that the Commission could take immediately.

Second, the Commission should expeditiously move towards an incentive auction of the broadcast spectrum. If adopted, the proposals above may provide an interim solution to the interference issues between Channel 51 and the Lower 700 MHz A Block. To resolve this problem, however, the Commission may need to conduct the incentive auction of the broadcast television spectrum authorized by Section 6403 of the Middle Class Tax Relief and Job Creation

⁶ See 47 U.S.C. § 312(g) (“If a broadcasting station fails to transmit broadcast signals for any consecutive 12-month period, then the station license granted for the operation of that broadcast station expires at the end of that period . . . except that the Commission may extend or reinstate such station license . . . to promote equity and fairness.”).

⁷ See, e.g., 47 C.F.R. § 73.1740(a)(2) (requiring TV stations to operate no less than 2 hours each day and no less than 28 hours each week).

⁸ See AT&T Comments at 47-48.

Act of 2012.⁹ Once this auction and the resultant rebanding are complete, the Lower 700 MHz – Channel 51 interference issues will be eliminated. The Commission, however, should avoid a repeat of the industry’s experience with the Lower 700 MHz band by ensuring during its rebanding that there is an adequate guard band between wireless operations and broadcast operations.

II. THE COMMISSION SHOULD REJECT PROPOSALS TO EXPAND THIS PROCEEDING BEYOND THE LOWER 700 MHZ BAND.

Some commenters argue that the FCC should expand the scope of this proceeding to consider mandating interoperability across the *entire* 700 MHz band.¹⁰ These commenters, however, fail to demonstrate how or why taking up this additional mandate is necessary to resolve the Lower 700 MHz A Block issues, and in fact it is not. As Verizon Wireless has previously explained, taking up such proposals also would disserve the public interest; the FCC would be intruding into the highly competitive mobile device market, forcing manufacturers to build devices with multiple bands and functions decided by regulatory fiat and forcing customers to bear the added costs and inconvenience of larger devices that would result from including bands and functions they do not need to obtain service.¹¹ Moreover, these proposals raise

⁹ See Title VI, Subtitle D of the Middle Class Tax Relief and Job Creation Act of 2012.

¹⁰ See Consumers Union, *et al.* Comments at 13-14; Cavalier Wireless, *et al.* Comments at 15; Edison Electric Institute Comments at 3; MetroPCS Comments at 6 n.14; NTCA Comments at 10-11; NTCH Comments at 2; T-Mobile Comments at 20-21; Utilities Telecom Council Comments at 3.

¹¹ See Comments of Verizon Wireless, *Petition for Rulemaking Regarding the Need for 700 MHz Mobile Equipment to be Capable of Operating on All Paired Commercial 700 MHz Frequency Blocks*, RM-11592, at 4-12 (filed Mar. 31, 2010). An interoperability mandate would also be unlawful. As Verizon Wireless and others have explained, no provision of the Communications Act authorizes the Commission to adopt such a mandate. And, such a mandate would be arbitrary and capricious because it would substantially undermine the service rules and policies for the 700 MHz band adopted prior to Auction 73. See *id.* at 16-27; see also AT&T Comments at 37-43; Research in Motion (RIM) Comments at 15-20. In addition, as the FCC

technical and cost issues, discussed below, that are entirely distinct from the issues discussed in the NPRM regarding the deployment of Band Class 12 in the Lower 700 MHz band.¹²

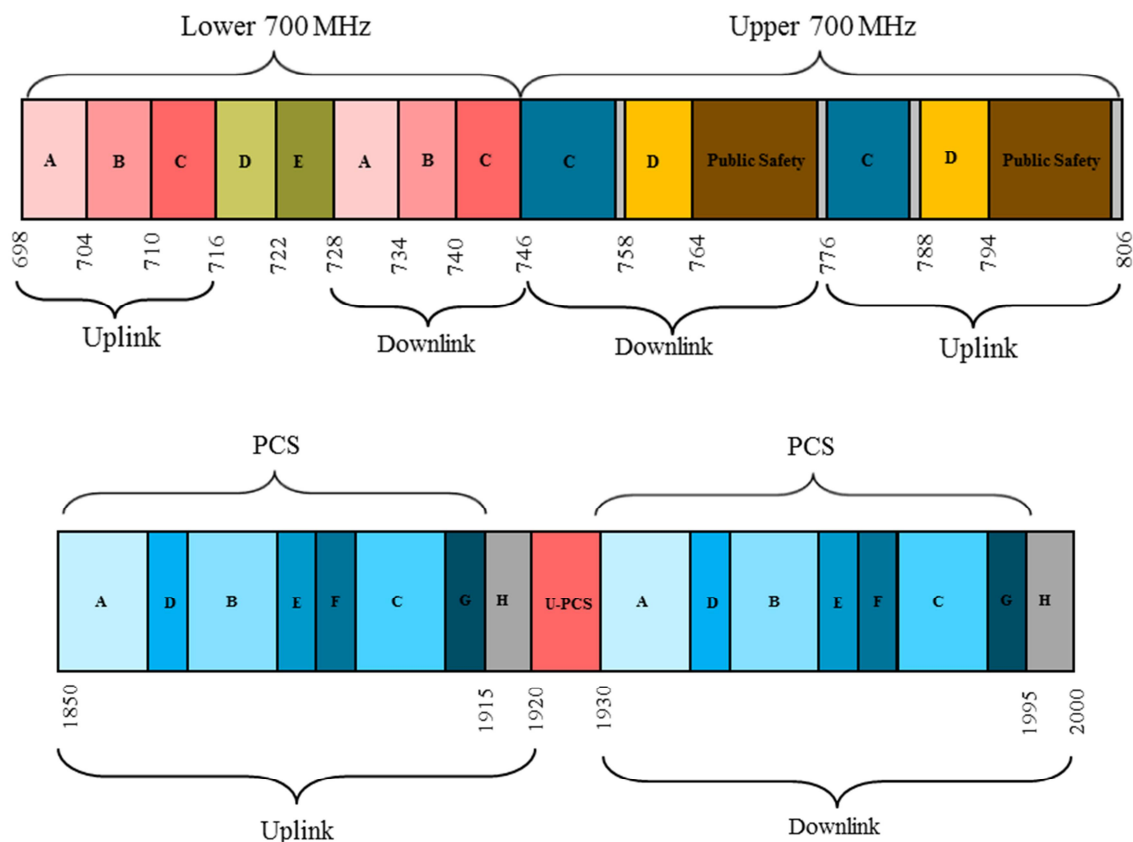
The Lower and Upper 700 MHz Bands are completely separate bands, as distinct from one another as each is from the Cellular, AWS and PCS bands. The facts that the two 700 MHz bands are adjacent and that the licenses in each band are governed by some of the same rules and, in some cases, were sold at the same FCC auction, do not change the fundamental technical differences between the Lower and Upper 700 MHz bands, which have important ramifications on device design, as discussed below.

Both 700 MHz bands include separate FCC licenses for paired spectrum that will accommodate frequency division duplex (FDD) operation, *i.e.*, transmission (“Tx”) and reception (“Rx”) via separate frequency blocks. However, unlike the spectrum blocks in the PCS band, the Lower and Upper 700 MHz bands cannot be considered as a single contiguous band of spectrum because the frequencies used for mobile transmission are not all contiguous. (*See* Figure 1.) The spectrum used by Lower 700 MHz licensees (A, B, and C Blocks) for mobile transmission (698-716 MHz) is separated by 60 MHz from the spectrum used by Upper 700 MHz licensees (C and Public Safety blocks) for that purpose (776-806 MHz). In contrast, the mobile transmit bands for the various PCS band segments are contiguous (also shown in Figure 1).

notes, *see* NPRM at ¶ 46, there are a host of issues related to interoperability across the entire 700 MHz band and the Upper 700 MHz band that were not raised in the NPRM, and so, consideration of interoperability beyond the lower band would require at the least a Further NPRM to satisfy Administrative Procedure Act notice requirements. *See, e.g., Prometheus Radio Project v. FCC*, 652 F.3d 431 (3rd Cir. 2011).

¹² *See* Qualcomm Comments at 58 (“technical mandates that reduce choice risk stifling innovation, delaying future interoperability solutions, driving up costs, reducing network capacity, and harming the public interest”).

Figure 1: Comparison of 700 MHz and PCS Bands



Given this configuration of the 700 MHz band,¹³ it is not possible to support both the Lower and Upper 700 MHz spectrum blocks in the same duplexer in the mobile device. A duplexer is a device that allows two-way communications. It is, effectively, the combination of two radiofrequency (“RF”) filters (one for transmit and one for receive) with a common antenna port. The duplexer must be designed for operation in the frequency band used by both the receiver and the transmitter, and must provide sufficient isolation between the transmit and receive bands to prevent the transmitter from desensitizing the receiver. Given the widely

¹³ The 3GPP standard specifies FDD operation with the Tx and Rx bands as shown in the illustration. While the FCC’s rules allow for FDD operation with the Tx and Rx bands switched, no specifications were adopted by 3GPP for that—largely because of the interference issues it would raise. Of course, TDD operation is also allowed by the FCC’s rules, but that configuration is also not supported in the existing standard and creates new interference issues.

separated *mobile* transmit bands (698-716 MHz and 776-806 MHz) for Lower and Upper 700 MHz, it is not feasible to build a duplexer that includes both sets of transmit bands while still providing sufficient isolation from the mobile receive (base station Tx) band.

As a technical matter, therefore, a single device cannot support all the Lower and Upper 700 MHz blocks without using multiple duplexers. While it is possible to build a device with multiple duplexers, this imposes additional cost and complexity that must be weighed against other factors, such as whether to include bands outside 700 MHz in the device, as discussed further below. These additional costs may be passed on from the manufacturer to consumers who may not ever use the additional duplexers. Accordingly, just like licensees of the Cellular, AWS and PCS bands, licensees of the Lower and Upper 700 MHz bands should be allowed to make independent decisions about which bands to include in devices that are built and sold for use by their respective customers.

With respect to including multiple duplexers in the same device, as Verizon Wireless and others have explained, there are various considerations that must be taken into account due to the current limitations on how many and what type of duplexers can be included in the same device, as well as the need for commercially-desirable device form factors.¹⁴ One critical limiting factor is the choice among available bands above and below 1 GHz. Qualcomm points out that there is a practical limit as to how many bands can be supported in a single mobile device; a mobile device of the size and form factor sold by most wireless carriers currently can only support two duplexers operating on bands below 1 GHz.¹⁵ While the number of duplexers a band can support

¹⁴ See AT&T Comments at 19-27; Consumer Electronic Association Comments at 2-8; Qualcomm at Comments 58-68; RIM Comments at 7-14; Telecommunications Industry Association Comments at 3-6.

¹⁵ See Qualcomm Comments at 60.

may increase over time, the number of possible below 1 GHz bands will substantially increase as well, particularly once the FCC has reclaimed and auctioned additional Digital TV spectrum bands. Thus, even though technology may evolve, manufacturers will still have to make decisions about which below 1 GHz bands to include in their devices.

Another limiting issue, which might pertain to licensees using Band Class 12 as well, is backwards compatibility. As Verizon Wireless deploys its LTE broadband network in the Upper 700 MHz C Block over the same geographic footprint in which it operates its 3G EV-DO network today, its LTE customers need to be able to use its 3G network where LTE is not available. The 3G network uses spectrum in the Cellular band and the PCS band. Consequently, the LTE devices that the company has been distributing over the past year and into the future will include both the Cellular and PCS bands, in addition to the Upper 700 MHz C Block. To the extent that other carriers need backwards compatibility as they deploy 4G networks, they may have to ensure inclusion of the Cellular band, which occupies one of the two or three below 1 GHz slots. Accordingly, such carriers would also have difficulty building devices that are mandated to include multiple 700 MHz band duplexers.

A third limiting factor in device design is simply the sheer number of duplexers that can be included in any single device. Manufacturers and mobile providers must weigh a variety of factors in deciding which bands to support, including placement of antennas, device form factor, battery life, weight, cost, and utility to the consumer. Currently, a typical mobile device can accommodate five duplexers; in the immediate future, the number may increase by an incremental two or three.¹⁶ But there will remain a physical limit on the number of duplexers that can be included.

¹⁶ See Qualcomm Comments at 61 (newest chipset will accommodate three bands below 1 GHz, three bands above 1 GHz, and one very high band, e.g., 2.5 GHz).

Today, Verizon Wireless is focusing on devices that would operate on the four bands it will use for its EV-DO and LTE networks (850 MHz and 1.9 GHz for EV-DO; Upper 700 MHz C Block and AWS for LTE). Each of these bands requires a separate duplexer, and, thus, each imposes requirements for space in the device, antennas and costs. Adding duplexers increases not just the costs for the form factor of the device but also for the required device testing and certifications, which can be significant for a new technology such as LTE. Verizon Wireless is also interested in providing products and services that address the broader global market, and, in some devices, will support bands that are widely used in other parts of the world but do not align with U.S. band plans. Adding these band classes increases complexity and costs and the size of the device.

Ultimately, device manufacturers compete to build commercially-attractive devices with the bands specified by carriers with whom they deal. Imposing band class requirements outside those requests increases the cost and complexity of the device by increasing the number of duplexers in that device. While consumers may not comprehend the complexity, they may pay the costs for the duplexers added by any regulatory mandate, whether they use those duplexers or not. Given the technical and cost impact on manufactures, mobile providers and consumers, the FCC should reject calls for interoperability across the entire 700 MHz band.

III. CONCLUSION

For the reasons set forth in Verizon Wireless' Comments and above, the Commission should not mandate interoperability in the 700 MHz band, but rather should support voluntary industry efforts to develop interoperability in the Lower 700 MHz band by facilitating voluntary relocation of TV Channel 51 stations to achieve that goal.

Respectfully submitted,

A handwritten signature in black ink that reads "John T. Scott, III". The signature is written in a cursive style with a horizontal line underneath the name.

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